

## CLAIMS

1. A radio cell station apparatus in a mobile communication system, signals received in said mobile communication system including already-known reference  
5 signals, comprising:

search means (40) for searching for a reference signal already used in a neighboring cell station;

storage means (70) for storing the reference signal detected by said search means (40); and

10 reference signal allocation means (40) for allocating, when a connection request is received from a terminal device, a reference signal different from the reference signal stored in said storage means (70).

2. The radio cell station apparatus according to claim 1, wherein  
15 before the connection request is received from said terminal device, said search means (40) receives in advance a communication signal communicated between said neighboring cell station and a terminal device communicating with said neighboring cell station, and analyzes a reference signal in use from the received communication signal, and

20 said storage means (70) stores and holds said analyzed reference signal.

3. The radio cell station apparatus according to claim 2, wherein  
said search means (40) searches for the reference signal used in said neighboring cell station for each traffic slot allocated to said terminal device.

25 4. A radio cell station apparatus in a mobile communication system, signals transmitted/received in said mobile communication system including already-known reference signals, comprising:

storage means (70) for storing a plurality of reference numbers different from each other; and

reference signal allocation means (40) for randomly selecting, when a connection request is received from a terminal device, a reference signal from said storage means (70) based on a cell station number assigned to each cell station and allocating the reference signal to said terminal device.

5        5. The radio cell station apparatus according to claim 4, wherein

10        said reference signal allocation means (40) allocates an  $i$ -th reference signal corresponding to value  $i$  of a remainder of division of said cell station number by total number  $m$  of reference signals stored in said storage means (70), where  $m$  is a natural number and  $i$  is a natural number of at most  $m$ .

15        6. A reference signal allocation method performed by a radio cell station apparatus in a mobile communication system, signals received in said mobile communication system including already-known reference signals, comprising the steps of:

searching for a reference signal already used in a neighboring cell station;  
storing said reference signal detected; and

20        allocating, when a connection request is received from a terminal device, a reference signal different from said reference signal stored.

7. The reference signal allocation method according to claim 6, further comprising the steps of:

25        before the connection request is received from said terminal device, receiving in advance a communication signal communicated between said neighboring cell station and a terminal device communicating with said neighboring cell station, and analyzing a reference signal in use from the received communication signal; and

storing said analyzed reference signal.

8. The reference signal allocation method according to claim 7, further comprising the step of searching for the reference signal used in said neighboring cell station for each traffic slot allocated to said terminal device.

9. A reference signal allocation method performed by a radio cell station apparatus in a mobile communication system, signals transmitted/received in said mobile communication system including already-known reference signals, comprising the steps of:

storing a plurality of reference numbers different from each other; and  
randomly selecting, when a connection request is received from a terminal device, a reference signal from said plurality of reference signals based on a cell station number assigned to each cell station and allocating the reference signal to said terminal device.

10. The reference signal allocation method according to claim 9, further comprising the step of allocating an  $i$ -th reference signal corresponding to value  $i$  of a remainder of division of said cell station number by total number  $m$  of said reference signals stored, where  $m$  is a natural number and  $i$  is a natural number of at most  $m$ .

11. A reference signal allocation program performed by a radio cell station apparatus in a mobile communication system, signals received in said mobile communication system including already-known reference signals, and said program performed for a computer to execute the steps of:

searching for a reference signal already used in a neighboring cell station;  
storing said reference signal detected; and  
allocating, when a connection request is received from a terminal device, a reference signal different from said reference signal stored.

12. The reference signal allocation program according to claim 11, said program performed for the computer to further execute the steps of:

5 before the connection request is received from said terminal device, receiving in advance a communication signal communicated between said neighboring cell station and a terminal device communicating with said neighboring cell station, and analyzing a reference signal in use from the received communication signal; and  
storing said analyzed reference signal.

10 13. The reference signal allocation program according to claim 12, said program performed for the computer to further execute the step of searching for the reference signal used in said neighboring cell station for each traffic slot allocated to said terminal device.

15 14. A reference signal allocation program performed by a radio cell station apparatus in a mobile communication system, signals transmitted/received in said mobile communication system including already-known reference signals, and said program performed for a computer to execute the steps of:

20 storing a plurality of reference numbers different from each other; and  
randomly selecting, when a connection request is received from a terminal device, a reference signal from said plurality of reference signals based on a cell station number assigned to each cell station and allocating the reference signal to said terminal device.

25 15. The reference signal allocation program according to claim 14, said program performed for the computer to further execute the step of allocating an  $i$ -th reference signal corresponding to value  $i$  of a remainder of division of said cell station number by total number  $m$  of said reference signals stored, where  $m$  is a natural number and  $i$  is a natural number of at most  $m$ .